Track B – Asphalt Plant Operations: Material Storage, Handling, & Delivery

2020 MAPA Spring Training – Black to Basics
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Aggregate Storage

- Separated stockpiles
- Good drainage
- Minimize segregation
Stockpile Moisture

- Water retention is maximized with well graded fine aggregate with high - #200 content (i.e., screenings)
- Screenings will typically hold more moisture than manufactured sand
- RAP and RAS stockpiles are also very prone to holding moisture
Stockpile Moisture

Coarse Sand

24 Hrs. After 2" Rain
Stockpile Moisture

- Avoid contamination by removing material from just above grade
- Reduce possibility of segregation by rotating up and through material
Aggregate Delivery

- Dividers on Aggregate Cold Feed Bins
- Material bins should not be heaped above divider walls
Aggregate Delivery

• Aggregate Cold Feed System
  – Provides uniform flow of aggregates to dryer
  – Flow rate controlled by:
    • Gate opening
    • Belt speed
  – Consistent feed rate
Aggregate Delivery

• Aggregate Cold Feed System
  – Scalping Screen rejects oversize
  – Weigh Bridge monitors flow rate
    • Must be maintained
    • Properly calibrated
    • Wind Guards installed
RAP Delivery

• Special Requirements and Designs:
  – More horsepower (larger output required)
  – Special designs to promote flow of material
  – RAP more prone to bridging
  – “Lump breaker” often found at discharge
Asphalt Cement Storage

• Tanks can be horizontal or vertical
• Tanks typically have hot oil heating coils
  – Some are heated electrically or with a burner
Asphalt Cement Temperatures

- Critical to proper coating of the aggregate
- Critical for proper placement and compaction
- Critical for a quality paving product
- Control AC temps through tolerances on mixing temperatures
Asphalt Cement Temperatures

• Manufacturer recommends it
• Protects asphalt from over-cooking
  – Blue Smoke
  – Loss of light ends
• Having a minimum temperature helps with compaction on the road
  – Ensures that the mixture will stay in a condition favorable to achieve compaction
Asphalt Cement Storage

Recirculating with a pump is suggested for some modified asphalts
Asphalt Cement Distribution

- Asphalt binder flow is controlled by the plant automation
- Automation adjusts asphalt binder flow at the asphalt pumping/metering unit
- Thermocouples used to measure temperature of binder at meter should be calibrated to make sure proper binder temperature is being taken
Asphalt Cement Distribution

- Verify proper specific gravity or AC weight/gallon is entered in meter
- Air leaks in binder lines can cause meters measuring gallons to count air as asphalt
  - Extracted binder content will be low
Asphalt Mixture Storage

• Many configurations:
  • Portable
  • Stationary
  • Single Silo
  • Multiple Silo
  • Over Truck Scale
Asphalt Mixture Storage

- With silos we are mostly concerned about:
  - Segregation
  - Temperature Loss
  - Oxidation
Asphalt Mixture Storage

- When using a silo, the contractor shall deliver material that is:
  - within the tolerance ranges as set forth on the Job Mix Formula
  - without segregation
  - without balling or hardening
Asphalt Mixture Storage

• Segregation is a much higher risk in silos that do not use a “Batcher”
Asphalt Mixture Storage

- Batchers drop a large mass of material at one time to reduce segregation
Asphalt Mixture Storage

• To reduce the opportunity for segregation:
  – Feed all batchers in center
  – Feed split-feed type batcher in-line with splitter
Asphalt Mixture Storage

- Insulation and hot oil heat helps reduce the effects of heat loss to the atmosphere.
Asphalt Mixture Storage

- Heat can escape out the batcher and draws in cool air to oxidize the mix
- Insulated batchers and heated silo gates reduce this effect
Asphalt Mixture Storage

- Seals on the bin top and silo gate area lengthen storage times by reducing the “Chimney Effect.” Air is trapped in an insulated and sealed environment.
Asphalt Mixture Loadout

• Truck Driver Communication
  – Truck routing
  – Release agents
  – Silo identification
  – Loadout procedure
Asphalt Mixture Loadout

• Truck Loading
  – Use multiple drops
  – Loading sequence:
    • front
    • back
    • middle
  – Always transfer HMA in “bulk”
    • do not allow mix to dribble from silo
Asphalt Mixture Loadout

- Truck Loading
  - Use multiple drops
  - Loading sequence:
    - front
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Asphalt Mixture Loadout

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Haul Trucks

• Insulated and tarped
  – Especially for thin overlays
  – Front and both sides of bed

• Clean, smooth bed
  – Approved release agent
  – *No diesel!*
Haul Trucks/Material Transfer
Mix Delivery

- Correct Number of Trucks for Uninterrupted Delivery to Paving Site
- Truck Driver’s Training
  - Constant Delivery
  - Getting In and Out of the Paver
  - Expeditious Cycling of Trucks
Avoid Extended Waiting Periods!!!
Avoid Running the Hopper Empty!!!!
Use of Material Transfer Vehicles

MTV mixer blends segregated mixture from truck and delivers it to the paver.
Mix Delivery

• Material Transfer Vehicle
  – Can help both mixture and temperature segregation
  – Keeps paver moving
  – However, it does add another LARGE piece of equipment to the paving train
    • Too big for some projects
    • Vertical clearance issues
    • Underground utilities
    • Bridge weight limits
Summary

• Aggregate stockpile management and control is the first step at the production facility towards quality mixtures.

• Cold Feed system must be properly maintained and calibrated in order to achieve the JMF target.

• Asphalt Cement storage and distribution is also vital to ensuring quality mixtures and long-life pavement performance.
Summary

• Proper silo storage practices are important for maintaining the integrity of the plant produced mixture
• Even something as fundamental as loadout can have a significant impact on the quality of the final mat texture
• Truck Driver training is vital to the success of the final pavement’s performance
Questions?

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